Liebert CSU3000 Chiller

Guide Specifications for 7.5 - 37 Ton CS/CD/CT Models

1.0 GENERAL

1.1 CS/CD MODELS

The main-frame coolant supply unit shall be a Liebert Model _____, self-contained, factory assembled system. Provide unit(s) with matching, dual refrigeration systems to provide both primary and redundant sources of chilled water to the main-frame computer system. This system shall be provided such that each chiller module can cool the main-frame computer; the second chiller module serves as a stand-by module.

1.2 CT MODELS

The main-frame coolant supply unit shall be a Liebert Model _____, self-contained, factory assembled system. Provide unit(s) with matching, dual refrigeration units to provide primary source of chilled water to the main-frame computer system. A third refrigeration module shall be provided to provide redundant cooling capacity.

The packaged coolant supply unit for each model shall have the following built-in components.

1.3 SUBMITTALS

Submittals shall be provided with the proposal and shall include: Single-Line Diagrams; Dimensional, Electrical, and Capacity data; Piping and Electrical Connection Drawings.

1.4 WARRANTY

The system shall be provided with a warranty against defects in material and workmanship for a period of one year from the start up date, not to exceed eighteen months from the date of shipment.

1.5 QUALITY ASSURANCE

The specified system shall be factory-tested before shipment. Testing shall include, but shall not be limited to: Quality Control Checks, “Hi-Pot” Test (two times rated voltage plus 1000 volts, per UL requirements), and Metering Calibration Tests. The system shall be designed and manufactured according to world class quality standards. The manufacturer shall be ISO 9001 certified.

2.0 PRODUCT

2.1 STANDARD FEATURES / ALL SYSTEMS

2.1.1 Cabinet and Frame Construction

The frame shall be constructed of heliarc-welded tubular steel. It shall be painted using the autophoretic® coating process for maximum corrosion protection. The exterior panels shall be insulated with a minimum of 1", 1 1/2 lb. density fiber insulation. All panels shall have captive, 1/4 turn fasteners and shall be removable for service access.

The main unit color shall be _____, and the accent panel color shall be _____. The exterior panels shall be powder coated.

2.1.2 Coolant Piping

The internal coolant piping shall include: isolating valves for each module, an expansion tank, water fill connection, pressurization connection and liquid-level sight glass; a circulating pump which shall provide _____ GPM at _____ feet of water total head; and a discharge check valve to prevent back flow.

The supply and return connections shall be 2 1/8" O.D. copper for connection to RR or ES header assemblies.

2.1.3 High Voltage Electric Panel

Each chiller module shall have a separate, self-contained high voltage electric panel. Each shall include a non-automatic, molded case circuit breaker that can be operated with the panel cover closed. The disconnect shall include a decorative trim to match the exterior trim of the unit. Each electric panel shall include starters, contactors, relays, transformers and dual-element fuses that protect each high-voltage circuit in the system. The electric panel shall be wired with one common electrical line connection.

2.1.4 Solid-State Control System

Each of the solid state control systems shall be powered from separate, non interconnecting 24 volt power sources. Each chiller module control system shall include the following: Start/Stop button, Silence button for the audible alarm; Manual reset circuit breakers; Back-lighted monitor panel (no message is visible until lit.)

The monitor panel shall display operating modes (Pump On, Cooling On) in white and alarm conditions in red. Alarm messages remain lit until the malfunction is corrected but the audible alarm may be silenced. If a second alarm condition occurs, the audible alarm shall sound again. The alarm panel shall activate with the following conditions:

- No Water Flow
- Low Water Temperature
- High Water Temperature
- High Compressor Head Pressure
- Loss of Power

The control system shall automatically energize the stand-by chiller module whenever any of the alert conditions exist and energize the "Stand-by—On Other Failed" message on the monitor panel.

The solid-state plug-in alarm module shall include a Push-to-Test circuit for testing all operating and alarm mode messages as well as the audible alarm. An individual Push-to-Test button shall be provided to test each alarm condition. This will verify the function of the audible alarm, the lights and the switchover to the stand-by module. A reset button shall reset a module after the malfunction has been corrected.

The control system shall also include a set of non-powered, normally open contacts for a remote customer alarm and two custom alarm inputs and visual messages to be customer specified.

2.1.5 Semi-Hermetic Compressors

The compressor shall be semi-hermetic with a suction-gas cooled motor, vibration isolators, thermal overloads, oil sight glass, manual reset high pressure switch, pump-down low pressure switch, suction line strainer, reversible oil pumps for forced feed lubrication and a maximum operating speed of 1750 RPM. The minimum EER for the compressor shall be _____ at ARI rated conditions (130°F SCT, 45°F SST, 15°F subcooling). Compressors may be suitable for capacity modulation in addition to hot gas bypass systems.

2.1.6 Refrigeration System

Each refrigeration system shall be direct expansion with separate, fully insulated shell and tube evaporator. The refrigeration circuit shall include a hot gas muffler, liquid line filter drier, refrigerant sight glass and moisture indicator, and adjustable externally equalized thermostatic expansion valve, liquid line solenoid valve, hot gas bypass solenoid and valve to control compressor capacity at reduced load. All components of the system shall be factory connected with type "L" refrigeration copper tubing.

2.2 STANDARD FEATURES/ INDIVIDUAL SYSTEMS

2.2.1 Air Cooled

Condenser

Each chiller module shall be provided with a Liebert manufactured, air cooled condenser. The low-profile, propeller fan condenser shall be designed for vertical air flow and include an integral electrical panel. The condenser shall balance the heat rejection requirements of each module at _____ °F. The copper-tube, aluminum-fin coil shall be housed in a corrosion-resistant aluminum cabinet.

LEE-TEMP Winter Control System

The LEE-TEMP winter control system shall allow start-up and provide positive head-pressure control at ambients as low as -30°F. The LEE-TEMP package includes factory insulated receivers, refrigerant sight glasses, pressure relief valves, 3-way head-pressure control valves and roto-lock valve for isolating the refrigerant charge. All necessary electrical components shall be factory installed, connected, and calibrated. Any components required to be installed by the installing contractor shall be done at no additional cost to the owner.

2.2.2 Water Cooled

Condenser

The water cooled condensers shall be cleanable, counterflow shell and tube with removable heads. Condensers shall be A.S.M.E. stamped for maximum refrigerant pressure of 400 PSI at 300°F. The unit shall require _____ GPM of _____ °F water and have a maximum pressure drop of _____ PSI.

Water Regulating Valve

The water-cooled condenser shall be factory piped with a head-pressure actuated water regulating valve (2-way) and a hand operated isolation valve.

2.2.3 Glycol Cooled

Condenser

The glycol-cooled condensers shall be cleanable, counterflow shell and tube with removable heads. Condensers shall be A.S.M.E. stamped for maximum refrigerant pressure of 400 PSI at 300°F. The unit shall require _____ GPM of _____ °F 40% glycol and have a maximum pressure drop of _____ feet of water.

Glycol Regulating Valve

The glycol-cooled condenser shall be factory piped with a head-pressure actuated water regulating valve (2-way with bypass) and a hand-operated isolated valve.

Drycooler

Each chiller module shall be provided with a Liebert-manufactured drycooler. The low-profile, propeller fan drycooler shall be designed for vertical air flow and include an integral electrical panel that contains all the necessary electrical components for both drycooler fans and glycol circulating pump. The condenser shall be designed for an outdoor ambient of _____ °F. The copper-tube, aluminum-fin coil shall be housed in a corrosion-resistant aluminum cabinet.

Glycol Pump Package

Each module shall be provided with a centrifugal pump mounted in a weatherproof, vented enclosure that matches the finish of the drycooler

2.3 GLYCOOL SYSTEMS (CS/CD MODULES ONLY)

2.3.1 Glycool Module

The glycool system shall be a basic glycol cooled system plus the necessary components to eliminate compressor operation during low ambient conditions automatically. The glycool system shall include a fully proportional 3-way mixing valve, and a solenoid valve to control glycol flow. All the control circuitry necessary to operate the system shall be factory installed, connected and calibrated.

2.4 ALTERNATE WATER SOURCE (CS/CD MODELS ONLY)

2.4.1 AWS3000 Module

The AWS3000 module shall provide a cooling capacity of _____ BTU/HR when cooling GPM of coolant water to _____ °F. A chilled water source of _____ GPM at _____ °F entering water temperature shall be required at a pressure drop of _____ feet of water. The module shall contain a circulating pump having a rating of _____ GPM at _____ feet of water total head and a fully proportional 3-way mixing valve to maintain a constant leaving water temperature. The shell and tube heat exchanger and piping shall be factory insulated. The system shall utilize a separate electrical panel and be integrated with the matching compressorized module.

2.5 OPTIONAL EQUIPMENT / ALL SYSTEMS

2.5.1 Liqui-Tect Sensors (Max. 2 Per Unit)

Provide _____ (quantity) solid-state water sensors under the raised floor. The field installed sensor shall activate a red “water under floor” indicator and the audible alarm.

2.5.2 Liqui-Tector Panel

Provide a Liqui-Tector panel to be centrally located in the computer room. It shall be capable of monitoring up to 20 remote Liqui-Tect sensors and other system related functions.

2.5.3 Locking Disconnect Switch

The non-automatic molded case circuit breaker shall be mounted in the high voltage section of each electric panel. The switch shall be accessible from the outside of the unit with the accent panel closed and prevent access to the high voltage electrical components until switched to the OFF position.

2.5.4 Dual Power Supply

The CSU3000 shall be provided with dual power supplies to enable the two modules to be separately powered. (Not available on CT Models.)

2.5.5 Floorstand

The floorstand shall be constructed of a heliarc welded tubular steel frame. It shall have adjustable legs with vibration isolating pads. The floorstand shall be _____ inches high.

2.5.6 Header Kit

The CSU3000 shall be provided with a field installed _____ (RR) (ES) header kit for connection of _____ (RR) (ES) hoses.

2.5.7 Quick-Connect Hose Kits

Provide with the CSU3000 system a complete hose kit capable of connecting the system to the CDU on the computer mainframe. The hose kit shall consist of _____ flexible hoses, each _____ feet in length, insulated with Armaflex type FR insulation or equal. The hose kit shall contain barbed fittings for connections at the supply and return headers of the chiller and factory-made connections on the other end with the proper male and female fittings to connect directly to the Coolant Distribution Unit.

2.5.8 Information Gathering Module

Provide an Information Gathering Module for CSU3000 that permits communication with a Liebert Sitemaster Model 200 or a Liebert SiteScan. The 3-module systems shall be equipped with interconnecting cable.

2.5.9 Separate Pump Power Connection

Provide one 3-phase power connection for all pumps and controls, and one 3-phase power connection for all other loads. Two locking disconnects shall be provided with this option on single module units. Four locking disconnects shall be provided on dual module units. Six on triple module units.

2.5.10 Crankcase Heater

A crankcase heater shall be provided to prevent the migration of refrigerant to the compressor during off cycles.

2.6 OPTIONAL EQUIPMENT CS/CD/CT MODELS

2.6.1 Capacity Control Valves

The semi-hermetic compressor shall be equipped with a capacity control valve that shall reduce compressor capacity by unloading on bank of compressor cylinders when activated by the capacity selector switch (except 37 ton unit). All control circuitry shall be factory installed and connected.

3.0 EXECUTION

3.1 INSTALLATION OF CHILLER UNIT

3.1.1 General

Install unit in accordance with manufacturer's installation instructions. Install unit plumb and level, firmly anchored in location indicated, and maintain manufacturer's recommended clearances.

3.1.2 Electrical Wiring

Install and connect electrical devices furnished by manufacturer but not specified to be factory mounted. Furnish copy of manufacturer's electrical connection diagram submittal to the electrical contractor.

3.1.3 Piping Connections

Install and connect devices furnished by the manufacturer but not specified to be factory mounted. Furnish a copy of manufacturer's piping connection diagram submittal to the piping contractor.

3.2 FIELD QUALITY CONTROL

3.2.1 Start up

Start up air conditioning unit in accordance with manufacturer's start up instructions. Test controls and demonstrate compliance with requirements.

Included in tech data SL-11700 (R11/97)